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Top Chemical Managers

More are coming from technical backgrounds

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News of the Week

- **Continued Soviet involvement** in chemical and toxin warfare is detailed in State Department report to Congress. **Page 6**
- **Dow withdraws from agreement** with Saudi Basic Industries Corp. to build \$1.5 billion petrochemical complex. **Page 7**
- **Newly formulated insect pheromone** is geared to lure the predatory soldier bug into devouring other pests. **Page 7**
- **Relief from painful kidney stones** may be imminent as drug to prevent stones in some patients nears FDA approval. **Page 8**
- **New research center** for adhesives and coatings will open Jan. 1 at Cleveland's Case Western Reserve University. **Page 8**

News Focus

- **Chemists and chemical engineers** are being tapped for chief executive positions in U.S. chemical firms more often than they were a decade ago, C&EN survey shows. **Page 9**

Business

- **Productivity in the chemical industry**, which fell sharply in 1980, still travels a rocky road despite current gains. **Page 14**

International

- **Depressed auto market for chemicals** may finally head up, and a new study predicts the U.S. will lead the way. **Page 16**

Government

- **EPA Administrator Anne Gorsuch** shares her convictions and her views on a broad spectrum of important environmental issues in an interview with C&EN. **Page 18**

Science

- **Anticancer properties of natural compounds** gleaned from the sea have been identified, and the structure of each compound has been determined. **Page 29**
- **Chorismic acid synthesis**, achieved by two research groups, has important implications for agricultural chemicals in its potential to aid development of herbicides. **Page 31**
- **Researchers speculate that a glycoprotein** is found universally on nerve cells and is responsible for wiring the brain. **Page 32**

Books

- **"The Atomic Complex: A Worldwide Political History of Nuclear Energy"** is viewed from the perspective of the French scientist, Bertrand Goldschmidt. **Page 34**

ACS News

- **Chemical Abstracts Service** plans to make everything in Chemical Abstracts available on-line by the end of 1983. **Page 38**
- **Prominent chemists can be "hired"** to lecture and reminisce through a new videotape program from ACS. **Page 38**

Chemical productivity problems persist

**Although current gains
in labor productivity may
suggest business pickup,
total-factor productivity
still has rough going**

Chemical industry productivity—the measure of output compared to a given unit of input, such as wages, employee hours, or capital—has been going a rocky road.

After peaking in 1979, productivity in the chemical industry fell sharply in 1980, according to the American Productivity Center (APC), a Houston-based pioneer in measuring U.S. productivity. In 1981, productivity then rose, although solely on the strength of labor.

Labor productivity may well rise again in 1982 for the chemical industry, because as layoffs occur, efficiency tends to improve. Available government figures for all U.S. industry indeed show such a trend this year, with a notable 4.0% annualized gain in purely labor productivity in the third quarter.

However, even such a rebound in the chemical industry may not be enough to raise total-factor productivity (including factors for both labor and capital), according to APC. The reason is that output per unit of capital is expected to drop sharply because of low plant utilization. Capacity utilization in the third quarter dropped to 63% for the U.S. chemical industry, according to C&EN's latest survey (C&EN, Oct. 11, page 12), compared with plant use rates of 72% in the third quarter of 1981.

For 1981, APC's chemical industry total-factor productivity index rose to 101.3 (1977 = 100), up 1.7% from 1980. This index had dropped about 4.0% in 1980 from the 1979 index of 103.7. Comparable indexes for all manufacturing show a similar pattern, with a gain of 1.6% to 100.6 in 1981 from 1980 after a decline of about 2.4% from 101.4 in 1979. The previous peak in the total-factor productivity index for all manufacturing, as with the chemical industry, also occurred in 1979.

The APC productivity studies are broken down by major segments of the economy such as goods-producing and the services-producing sectors. Further breakdowns include farming, manufacturing, nonfarm manufacturing, and nonfinancial corporate business. Manufacturing is broken down into the various major industries such as chemicals, petroleum, rubber, and food. Nonfarm manufacturing includes such industries as mining, construction, transportation, and trade.

The chemical industry differs some from all manufacturing in its productivity components. In 1980, for example, labor productivity for the chemical industry declined more from 1979 than for all manufacturing, according to APC indexes. However, the recovery in 1981 for the chemical industry was larger than for all manufacturing, with the index rising from 102.0 to 105.3, or more than 3.2%, in comparison to a gain from 101.4 to 104.0, or nearly 2.6%, for all manufacturing.

Output per unit of capital for the chemical industry declined an average of 3.1% annually between 1979 and 1981; other industry groups had greater declines. For example, petroleum industry capital productivity declined to 92.3 in 1980 from 105.1 in 1979 and dropped further in 1981 to 85.9. That of primary metals fell from 100.7 in 1979 to 92.8 in 1980 and to 91.0 in 1981.

By contrast, indexes for ratios of capital-to-labor inputs compiled by APC have improved for all of the manufacturing groups. All manufacturing itself in this index moved ahead of the chemical industry in 1980 and remained ahead in 1981. The gains in the capital-labor ratio indexes show the importance of looking at both parts of the productivity output factors, says APC vice president Carl G. Thor. As for specifics, the chemical industry ratio grew in both 1980 and 1981, averaging a 3.5% annual change for these years. For the petroleum industry, this ratio grew substantially in 1980, rising to 16.2 from 99.7 in 1979, but fell off some in 1981 to 110.3. The primary metals ratio index also went up rapidly in 1980, reaching 111.1 from 97.0 in 1979, and continued to rise in 1981 to 114.6.

Other segments of the economy, except for farming and nonfinancial corporate business, turned down in total-factor productivity during the 1979-81 period. Total-factor productivity for farming rose from 105.7 in 1979 to 107.4 in 1980 and to 113.6 in 1981 as both labor and capital productivity improved. Of all the major segments, farming alone had better capital productivity in 1981 than it did in 1979.

Total-factor productivity of most industry groups in the nonfarm non-manufacturing segment of the economy generally declined as well in the

Labor factor was main influence in chemical industry's 1981 productivity rise

Index, 1977 = 100	1981	1980	1979	1971	% average annual change	
					1979-81	1971-81
Total factor productivity						
Chemical industry	101.3	99.6	103.7	82.5	-1.2%	2.1%
All manufacturing	100.6	99.0	101.4	86.7	-0.4	1.5
Output per unit labor						
Chemical industry	105.3	102.0	104.8	77.2	0.2	3.2
All manufacturing	104.0	101.4	101.9	84.1	1.0	2.4
Output per unit capital						
Chemical industry	95.5	96.0	101.9	92.3	-3.1	0.4
All manufacturing	91.7	92.7	99.9	95.5	-4.2	-0.4
Capital-labor ratio						
Chemical industry	110.1	106.2	102.8	83.7	3.5	2.8
All manufacturing	113.4	109.4	102.0	88.1	5.4	2.8

Note: Data for years other than 1981 are revised to reflect revisions in various government data.
Source: American Productivity Center

1979-81 period. Among the few exceptions is the communications industry, whose total-factor productivity index rose from 107.9 in 1979 to 113.0 in 1980 and to 116.7 in 1981.

More detailed information on industry components in the current frontier at APC. This year APC worked out productivity ratios for such SIC categories as 331 (blast furnace, basic steel products), some human and pet food classifications, and 3079, miscellaneous plastics products. Data for 1980 and 1981 for these classifications have been extrapolated.

For the miscellaneous plastic products, mainly fabricated plastic materials (film and sheet, pipe, and the like), the extrapolated total-factor productivity index rose to 95.9 in 1981, above the 1979 level of 94.2 and well above the 1980 level of 91.9. As might be expected from results of the chemical and similar industries, the labor productivity index for this classification rose in 1981, reaching 107.2, up from 101.9 in 1980 and 99.2 in 1979. And, as expected, the capital productivity index reached 87.5 in 1981, up from the 1980 level of 84.4 but down from 90.7 in 1979.

Details of the APC input ratios for the miscellaneous plastic products classification show that value added rose in 1981 to an index of 110.0 from 105.0 in 1979 and 101.0 in 1980. Labor input, after falling to 99.5 in 1980, rose to 102.9 last year, still below the 106.4 of 1979. Capital, materials, and energy inputs all rose to well above the 1979 levels. The net result was the gain in productivity.

Even though productivity in the manufacturing industries generally declined as a result of the recession, the gain in labor productivity can be considered an indicator of underlying recovery, Thor suggests. Although the gains are not large, they do indicate basic business improvement. These modest gains come at the same time as relatively large increases in stock prices, which could suggest a stronger recovery will be coming.

So changes in labor productivity can be considered a leading indicator, Thor says. During a recovery, labor productivity improves faster at first and then slows as the recovery gets stronger.

Deeper into a recovery, capital productivity gains more rapidly. This is the result of a lower inventory-to-sales ratio and better plant operating ratios. Again, later into a recovery or perhaps early into a decline, the capital productivity growth slows or declines. □

CHECKOFF

NEW PLANTS

■ **Chromium dioxide**—Du Pont will begin second phase of expansion of Newport, Del., plant to make magnetic particles of this oxide for use in audio, video, and data storage tapes, to be completed by late 1983; undisclosed capacity will be doubled following this expansion and completion of first phase.

■ **Ethylene acrylic acid polymers**—Dow Chemical plans to spend about \$50 million for new plant in Freeport, Tex., to make these resins used in adhesives, sizes, and coatings; plant will add about 60 million lb per year to Dow's capacity when on stream in early 1985.

■ **Industrial gases**—Air Products will build air separation plant to supply about 900 tons per day of oxygen and 400 tons per day of nitrogen to Texaco's refinery at Convent, La., at cost of \$40 million. Oxygen will be supplied at 1100 psi, to partial oxidation unit to make hydrogen for converting petroleum residue to distillate fractions.

■ **Trichloroethylene**—Vulcan Chemicals, division of Vulcan Materials, plans to start engineering and design on unit to make this solvent at Geismar, La., plant; details on construction and size of facility are unavailable.

PLANTS COMPLETED

■ **Acrylic acid**—Badische has dedicated new world-size acrylic acid plant at Freeport, Tex., completing \$120 million acrylic monomers complex. In March, rebuilt and expanded 2-ethylhexylacrylate unit was started up and in June new butyl acrylate plant began operations; total capacity of three units exceeds 350 million lb per year.

■ **Carbon fibers**—Union Carbide has begun production of polyacrylonitrile-based carbon fibers in Greenville, S.C., in 1 million lb-per-year plant. Company earlier had completed unit to make carbon fibers from petroleum pitch; two units cost more than \$50 million.

■ **Fluoropolymers**—Allied Fibers & Plastics has started up Orange, Tex., plant making these resins used for wire and cable coverings. Of undisclosed capacity, plant augments production from company's Elizabeth, N.J., unit.

■ **Industrial gases**—Liquid Air Corp.'s industrial gases division has started up air separation plant in Anchorage, Alaska, thereby ending need for shipping liquid oxygen and nitrogen from out of state.

■ **Linear alkylbenzene**—Conoco Chemicals is starting up new unit at Lake Charles, La., with capacity of 150 million lb per year of this intermediate for detergents. Startup had been delayed from third-quarter 1982 to minimize construction costs.

■ **Monocalcium phosphate**—FMC Corp. has begun making and selling food-grade phosphate derivative in multimillion lb-per-year plant in Buffalo, N.Y., for use in baking materials and dry beverage mixes.

LABORATORIES

■ **W. R. Grace** will build \$3.1 million fermentation pilot plant at its Washington Research Center in Columbia, Md., to develop line of pharmaceutical-grade amino acids.

■ **Badische** has opened new plasticizer technical center at company's Kearny, N.J., plant site, following relocation from Wyandotte, Mich.

■ **FMC Corp.** has dedicated \$30 million agricultural research facility, located at chemical research complex near Princeton, N.J.

■ **IMCO Services**, division of Halliburton, will build 80,000-sq-ft building in Houston, Tex., as new technical center at cost of \$7.5 million; completion due in September 1983.

■ **Warner-Lambert's Parke-Davis** research division has begun construction on \$28 million preclinical laboratories building in Ann Arbor, Mich.; 95,000-sq-ft building to be opened in late 1984.

Chemicals' auto market could rebound

Long-suffering automobile business is finally heading up, says a new consulting study, and the surprise is that U.S. will lead the way

Has the giant auto market for chemicals been written down too soon? It has slumped all over the world since 1979 and has been part of chemical companies' standard explanation for their earnings woes this year. Not much more is expected in 1983.

For example, in a typical letter to stockholders last month, Celanese chairman John D. Macomber and president Allan R. Dragone say, "The demand for Celanese products is closely linked to sales of autos, housing, energy, and apparel. Although we have not yet had a real upturn in any of these sectors of the U.S. economy, we expect these industries and our own businesses to recover gradually in 1983."

Other chemical executives think the future for U.S. autos may be worse. Stauffer Chemical chairman H. Barclay Morley gives autos as a prime example of U.S. chemical markets moving offshore, to Japan in this case. He believes U.S. companies will have to follow or lose out (C&EN, Nov. 8, page 14).

But maybe not. A new study from consultants DRI Europe in London (part of Data Resources of the U.S.) concurs in ugly detail on the depressed current state of the world-

wide auto business. But DRI winds up with considerable confidence for the industry from 1983 through 1986, especially in the U.S.

"The world motor industry has generally seen 1982 as yet another poor year," says DRI, "with the anticipated recovery pushed back to the first half of 1983. There have been exceptions in Europe, where the industries of West Germany, Spain, and Sweden all have shown gains over their performance in 1981. The situation in North America continues to be desperately bad. In Japan the outcome for 1982 also will be poor as rising domestic sales will fail to compensate for a severe drop in Japanese exports."

Unfazed, DRI says the world auto business can "expect to do much better in 1983 and 1984 as economic conditions improve." Here's why:

- Deferred replacement demand. "The car populations of the world have aged significantly since 1979, and replacement of these cars will provide a clear boost to new car demand, particularly in North America."

- Rise in real consumer income over the next few years as inflation lags workers' pay.

- Stability in energy prices relative to inflation. There will be no new sudden rise or associated shortage.

These forces won't break auto companies' financial distress, DRI cautions, but still will push up car volume. Detroit and other motor capitals will remain poor because cash generation will fall far short of cash requirements.

Whatever, DRI comes up with

some big numbers for recovery in autos by the mid-1980s. Despite a slow start in 1983, the U.S. will lead the pack by 1986 in both overall market growth and in home production. New car sales will pick up 14% in 1983 to 8.88 million from their extremely depressed rate of 7.78 million in 1982. By 1986, sales will be up 36% from 1982 to 10.61 million.

The U.S. production gain will be even better. DRI puts North American car production at 7.22 million next year, up 24% from 5.82 million in 1982. Production forecast for 1986 is 8.64 million, 48% higher than in 1982.

For U.S. gains to reach this size, the big loser would have to be Japan. DRI is not high on prospects for further inroads by Japanese cars in the U.S., predicting government protection to keep Japanese imports below 2 million units per year.

Quotas also will restrict Japanese exports to Europe and other markets, DRI says, and a steadily rising value of the yen will not help. Because of these and other factors, DRI foresees less than half the U.S. rebound in Japanese auto production in 1983—just 9%. By 1986, auto output in Japan will be up 20%.

In Europe, recovery also is due in most countries but at generally lower rates. The leading auto power there will remain West Germany, which survived a difficult 1982 with rising volume largely on the strength of new car development and exports. Overall, DRI views car sales in Europe up 6% in 1983 and 16% by 1986 from 1982. For production, the gains will be less, up 4% next year and 14% in 1986. □

U.S. auto market will grow faster than in other major economies . . .

Millions	New car sales			% change	
	1982	1983	1986	1982-83	1982-86
U.S.	7.78	8.88	10.61	14%	36%
Europe, total	9.71	10.32	11.24	6	16
West Germany	2.09	2.32	2.71	11	30
France	1.99	2.08	2.01	5	1
Italy	1.67	1.80	1.72	-4	-3
U.K.	1.50	1.63	1.66	9	11
Japan	2.92	3.18	3.21	9	10

Source: DRI Europe

. . . and North American car output is due for an even sharper rebound

Millions	Car production			% change	
	1982	1983	1986	1982-83	1982-86
North America	5.82	7.22	8.64	24%	48%
Europe, total	10.04	10.43	11.40	4	14
West Germany	3.71	3.82	4.19	-3	13
France	2.59	2.61	2.72	1	5
Italy	1.39	1.42	1.59	2	14
U.K.	0.89	0.87	0.90	-2	1
Japan	6.47	7.02	7.74	9	20